## Space Weather Forecast

Issued on Monday, 12 September 2022 at 13:30 Local

**This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales**

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**Space Weather Forecast Headline: Increased Chance of M-class and X-class flares. Ongoing Active electron fluence. Risk of CME arrival on 13 or 14 September. Very slight chance of S1 proton storm.**

**Analysis of Space Weather Activity over past 24 hours**
**Solar Activity:** Solar activity has been low, with only Common-class flare activity. there are eight sunspot on the visible disc, three of which carry the majority of the flare risk. The largest and most prominent of these is in the north-centre disc, which appears to have produced a significant CME (coronal mass ejection) eruption in the last 24 hours. This will be analysed once further imagery is available.

**Solar Wind / Geomagnetic Activity:** Solar wind speeds have declined from slightly elevated to background levels, as the earth leaves a fast wind environment. Magnetic field strength was weak throughout, with the north-south component weakly negative. Geomagnetic activity was Quiet to Unsettled, with one Active interval on 11 September.

**Energetic Particles / Solar Radiation:** No solar radiation storms were observed, with the recent slight enhancement of 10MeV protons stabilising near 1pfu, where 10pfu represents S1.

**Four-Day Space Weather Forecast Summary**
**Solar Activity:** Solar activity is expected to increase from Low levels through the forecast period, perhaps reaching Moderate or Strong levels due to the potential flares from three sunspot regions, and one just about to rotate onto the visible disc.

**Solar Wind / Geomagnetic Activity:** A CME which was observed leaving the Sun on 11 September may arrive at Earth on 13 or 14 September, although confidence is low, as insufficient imagery is currently available to model the feature accurately. Otherwise no further features are expected to affect the Earth. Geomagnetic activity is forecast to be mainly Quiet to Unsettled on day 1 and much of day, with mainly Active and a chance of G1/Minor Storms late on day 2 or during day 3, due to the risk of a CME arrival, although this aspect of the forecast is low confidence.

**Energetic Particles / Solar Radiation:** No solar radiation storms are expected, although the growth of current sunspot regions and recent increases following a CME has led to a slight rise in risk of S1.

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# Met Office Space Weather Forecast

**Geomagnetic Storms:**

| Geo-Magnetic Storm Probability (Exceedance) | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Minor or Moderate | G1 to G2 | No | 1 | 30 | 30 | 10 |
| Strong | G3 | No | 1 | 1 | 1 | 1 |
| Severe | G4 | No | 1 | 1 | 1 | 1 |
| Extreme | G5 | No | 1 | 1 | 1 | 1 |

**Radio Blackouts - X Ray Flares:**

| X Ray Flares Probability | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | R1-R2 M Class | No | 50 | 50 | 50 | 50 |
| Very Active | R3 to R5 X | No | 10 | 10 | 10 | 10 |

**Solar Radiation Storms - (High Energy Protons):**

| Radiation Storms Probability (Exceedance) | Level ($cm^{-2}$ $sr^{-1}$ $s^{-1}$) | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | ≥ S1 | No | 10 | 10 | 10 | 10 |
| Very Active | ≥ S3 * | No | 1 | 1 | 1 | 1 |

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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